

# Work Order ID 58497

May 7, 2010 2:21:57 PM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Item Name: Replacement Skidtube

Stop



Start Date: 07/05/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 24/05/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

*[Signature]*

Date: 10-5-07

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D2580	Rev D								

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

*8.10/15/31*

*for BG 10/05/31*

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

*4 10/5/18*

58497

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
Skidtubes	Memo	0.00							
Skidtubes	1- Deburr ends								
	2- C'sink holes as per dwg without cutting fluid								
	3- Prepare tube for welding, remove alodine as required.								
	4- Scribe batch number insied aft end of tube.								
130	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

1 M 12/5/18

1 0 2E 09/05/19

W/O:		WORK ORDER CHANGES					
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Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004

A/R□□□ Aluminum Rod

M112860

BE 10/05/19

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.

For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill

A/R□□□ Aluminum Rod

M112860

BE 10/05/19

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 &amp; DT8937 Open holes to 19/64", adjust stopper not to hit web. Deburr

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Deburr holes

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Deburr

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Deburr

M 10/15/19

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Sequence ID/  
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Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

QC10- Inspect visual per QSI004- ground welds

0.00

S 10/05/10



QC

Memo

0.00

Quality Control

160

QC5- Inspect part completeness to step on W/O

0.00

S 10/05/10



QC

Memo

0.00

Quality Control

170

Pressure Wash per QSI005 4.3

0.00



HandFinish

Memo

0.00

Hand Finishing

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.

① BR 10-5-20

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Run Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

180



Powdercoat

Powder Coating

White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum

11114207

0.00

⇒ JH 10/05/21

0.00

Memo

START TIME: 7:30AM

OVEN TEMPERATURE: 320°F

FINISH TIME: 8:00AM

1 9

190



QC

Quality Control

QC3- Inspect Part Finish

0.00

Memo

0.00

1 BL 10-5-25,

W/O:		WORK ORDER CHANGES					
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DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates.  
A/R ☐ ☐ ☐ Sikaflex-291 M1137435  
Sikaflex expire date: 10/11

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive  
A/R ☐ ☐ ☐ Sikaflex-291 M1137435  
Sikaflex expire date: 10/11

5-Wing Walk as per Dwg D2580 and QSI 005 4.4  
Batch: M114482

①

BK 10-5-27.

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00

6/05/10



QC

Memo

0.00

20

Quality Control

Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

220

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD205-634-041

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

10/05/10

230

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/06/10  
MF  
10-5-10

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Page 1

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Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ  
 IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD  
 IPP Rev. O 06.02.28 Added paperwork EC  
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 07/05/2010

Required Date: 24/05/2010

Start Qty: 1.00

Required Qty: 1.00

D2580-1 Manufactured No 110 Each 9.0000 1



205 Skidtube bent detail



*QMBD B58618 4105/18*

Location	Loc Qty	Loc Code
LG	9	
57028	1	
57347	1	
57902	1	
57938	2	
58090	2	
58112	2	

D2576-3 Manufactured No 140 Each 110.0000 1



Step (maching detail)



Location	Loc Qty	Loc Code
LG	110	
46661	62	
52215	48	

*1 BE 10/05/19*

D2579 Manufactured No 140 Each 193.0000 20



Crossbolt Spacer



Location	Loc Qty	Loc Code
LG	193	
57052	13	
57348	180	

*20 BE 10/05/19*

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No 200 Each 105.0000 1



Cap



Location	Loc Qty	Loc Code
FP6	2	
56613	2	
ST026	103	
50513	1	
50770	29	
51539	19	
53791	54	

1 BL 10-5-27

AN3-5A Purchased No 200 Each 963.0000 2



Bolt



Location	Loc Qty	Loc Code
ST350	963	
105057	963	

2 BL 10-5-27

AN960JD10L Purchased No 200 Each 4,297.000 2



Washer



Location	Loc Qty	Loc Code
ST348	4297	
110985	4297	

2 BL 10-5-27

ALS7-1032-130 Purchased No 200 Each 17.0000 50



Insert



ALS4-1032-130  
~~ALS11~~

Location	Loc Qty	Loc Code
ST282	17	
113238	17	

50 BL 10-5-27.

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

AN3C4A Purchased No 200 Each 1,939.000 50



BOLT

Location	Loc Qty	Loc Code
ST350	1939	
114103	501	
114108	300	
114416	138	
114523 ✓	1000	

AN960C10L Purchased No 200 Each 0.0000 50



washer

D3566-13



Gasket

WAS 1149C0332R

114 3411

Manufactured No 200 Each 33.0000 1



Location	Loc Qty	Loc Code
FP	33	
53461 ✓	33	

D3566-5 Manufactured No 200 Each 21.0000 1



Gasket

Location	Loc Qty	Loc Code
FP015	21	
57526	1	
57682 ✓	20	

30 BR 10-5-27

30 BR 10-5-27

1 BR 10-5-27

1 BR 10-5-27

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Start Date: 07/05/2010

Required Date: 24/05/2010

Start Qty: 1.00

Required Qty: 1.00

D3566-1 Manufactured No 200 Each 41.0000 2



Gasket

Location	Loc Qty	Loc Code
FP015	41	
57715 ✓	20	
58182	21	

2 BR 10-5-27

D3564-11 Manufactured No 200 Each 9.0000 1



Wearshoe

Location	Loc Qty	Loc Code
FP019	9	
57957 ✓	9	

1 BR 10-5-27

D3564-13 Manufactured No 200 Each 27.0000 1



Wearshoe

Location	Loc Qty	Loc Code
FP17	27	
56533	1	
57684 ✓	12	
57922	14	

1 BR 10-5-27

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Start Qty: 1.00

Required Qty: 1.00

D3564-9 Manufactured No 200 Each 22.0000 1



Wearshoe



Location Loc Qty Loc Code

FP 1  
55334 1  
FP019 21  
57685 7  
57958 ✓ 14

1 BR 10-5-07

D3564-5 Manufactured No 200 Each 7.0000 1



Wearshoe



Location Loc Qty Loc Code

FG 1  
34806 1  
FP19 58709 6  
57525 1  
57729 5

1 BR 10-5-07

D2594-3 Manufactured No 200 Each 407.0000 16



O-Ring, 205 Skidtube



Location Loc Qty Loc Code

FP 407  
55546 19  
58191 ✓ 388

16 BR 10-5-07

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IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2594-1

Manufactured No

200

Each

382.0000

16



Plug, 205 Skidtube

Location

Loc Qty

Loc Code

FP

58497  
42807  
55002  
57826

382  
112  
128  
142

16. PL 10-5-27.

May 7, 2010 2:22:02 PM

Shop Packet Print

Page 6

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**DART**

DESIGN #	DRAWN BY RH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED #	APPROVED #	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

**RELEASED**  
07.06.28 #

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

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UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 58997

B/A-502

**GENERAL NOTES:**

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:  
SEE NOTES ON  
PAGE 2 FOR D2580-041 AND  
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Diagram illustrating the grinding locations for the D2576-3 step. The diagram shows a cross-section of the step with the following labels:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576

#0.208

DRILL PRIOR TO D2855 CAP  
INSTALLATION (2 PLACES)

SEAL WITH  
SIKAFLEX-241/-291

AN3-5A BOLT (1)

AN960J10L WASHER (1)  
(2 PLACES)

D2855 CAP

0.40

5

D2579 SPACER

D2596 WEB (REF)

ALS7-1032-130 (REF)  
(TYP 50 PLACES)

AFTER DRILLING AND BENDING ASSEMBLY PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C-BORE D2579 SPACER TO Ø0.437 X 1.00 DEEP

[illegible][illegible]

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

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HAMPSHIRE, ONTARIO, CANADA

DRAWING NO.	REV. D
D2580	SHEET 2 OF 3
TITLE	SCALE
205 SKIDTUBE ASSEMBLY	1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

RELEASED  
07-16-28

GRIND FLUSH (4 PLACES)

GRIND FLUSH

D2576-3 STEP

LOCATION RIDGE ON UNDERSIDE OF D2576

GRIND FLUSH

1/8"

Technical drawing of a circular component with the following annotations and dimensions:

- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)**: Points to two small circles on the left side of the component.
- #0.208**: Dimension for the diameter of the two small circles.
- AN3-SA BOLT (1)**: Points to a bolt on the left side.
- AN960J/D10L WASHER (1)**: Points to a washer on the left side.
- (2 PLACES)**: Points to two small circles on the right side.
- D2855 CAP**: Points to a cap on the right side.
- SEAL WITH SIKAFLEX-241/-291**: Points to a seal on the right side.
- SEE NOTE ii)**: Points to a dashed line on the right side.
- 0.40**: Dimension for the distance between the two small circles on the right side.

Diagram illustrating the components of a propeller hub cross-section:

- D2579 SPACER
- D2596 WEB (REF)
- AL57-1032-130 (REF) (TYP 50 PLACES)
- AFTER PERFO
- 1. CHA
- 2. INS
- 3. WEI
- 4. C'B

AFTER DRILLING AND BENDING ASSEMBLY  
PERFORM THE FOLLOWING FOR Ø0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO Ø0.437 X 1.00 DEEP

[illegible][illegible]

8497

WELD AS PER DETAIL F

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

NO C'BORE NO PLUG

NO C'BORE NO PLUG

NO C'BORE NO PLUG

NO C'BORE NO PLUG

D3566-1

D3566-5

D3566-1

D3566-13

D3564-11

D3564-5

D3564-9

D3564-13

AN3C4A BOLT (1)

AN960C10L WASHER (1)


(50 PLACES)

DESIGN

DRAWN BY

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE WITH THE SPACER AT THIS LOCATION

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DRAWING NO.	REV. C
D2580	SHEET 3 OF 3
TITLE	SCALE
205 SKIDTUBE ASSEMBLY	1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries



NO. 232

AWS D17.1.2001  
QUALIFICATION TEST RECORD

Name: Barclay Elliott  
Job number: 58508  
Part number: D205 634 041  
Description: 205 tube  
Welding Process: Tig[☒] Mig[ ]  
Base material: Aluminium  
Current: AC[☒] DC[ ]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[ ]  
Penetration: pass[☒] fail[ ]

UNACCEPTABLE

Cracks: pass[☒] fail[ ]  
Undercut: pass[☒] fail[ ]  
Pin holes: pass[☒] fail[ ]  
Overlap (cold lap): pass[☒] fail[ ]  
Porosity (surface): pass[☒] fail[ ]  
Coloration: pass[☒] fail[ ]

Qualifier Rob Panch Date of Test Coupon 10.05.18  
Welder Barclay Elliott Date of Test Coupon 10.05.18

The above named individual is qualified in accordance with AWS D17.1.2001 to weld